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16th. Observed two diagonal markings on the equatorial belt, also stiplings of bright cloud. The brightness of these floating clouds was very striking. The light earthy colour of the Great Belt seems to preclude the notion of the planet's still giving out any light of itself.

Dec. 6th. Observed the light yellow colour of the belts and satellites of *Jupiter.*

Dec. 8th. Watched for the occultation of ζ *Tauri*, Greenwich mean time of apparent conjunction in right ascension of Moon and Star, $5^h\ 0^m\ 3^s$. Limiting parallels, N. 90 — N. 19. Lat. of place of observation, 30° 42′ 4″. No occurrence. The Moon passed at least 10′ north of the star to the best of my judgment.

Telescope used 4¼ in. by Cooke and sons. Defining power excellent. By using a Barlow lens, and thus more than doubling its powers, it has separated ε *Arietis*, also shown the faint companion of κ *Geminorum*, test-objects for a 6-inch telescope.* "Good nights" are not very frequent, except in the cold season. Scintillation of stars within about 12° degrees of the horizon, is very considerable, even at my present elevation, about 7300 feet.

I fear there is nothing else in my notes worth communicating. I have not been able to obtain a good view of *Venus* lately, owing to the heavy fogs. The terminator appears irregular.

P.S.—Place of observation at present :—

	°	′	″
Latitude	30	42	49
	h	m	s
Longitude	5	11	42

Elevation about 7300 feet.

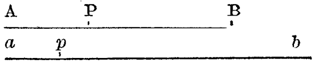
Churkrata, N. W. Provinces, Bengal.
July 12th, 1871.

Hyperbolic and Napierian Logarithms.

By Prof. A. D. Wackerbarth.

In almost all the elementary works—English, French, and German—which we make use of in teaching mathematics, the *natural* or *hyperbolic* logarithms are stated to be identical with the *Napierian.* But this is far from being really the case, and the difference is indeed fully stated in the introduction to Hutton's *Tables.* The highly gifted nobleman who invented logarithmic calculation defines his system thus :

Let a point p move with uniform velocity from a along the indefinite line ab, while another point P simultaneously moves from A along the finite line AB with a velocity proportional to PB, then is ab the logarithm of PB.



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* This is dated Jan. 26th, 1871.

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Let $AB = a$, $AP = x$, $ap = y$, and $BP = a - x = u$, and Log_N signify "Napierian logarithm of." We have, h and k being constants,

$$\frac{dy}{dt} = k \text{ and } \frac{dx}{dt} = h \,.\, (a - x)$$

therefore $y = k\,t$, no constant being required, and

$$-\,\mathrm{Log}_e\,(a - x) = h \,.\, t + C,$$

$$\text{therefore } -\,\mathrm{Log}_e\, a = C,$$

$$\mathrm{Log}_e \frac{a}{a - x} = h\,t, \quad \text{or} \quad \mathrm{Log}_e \frac{a}{u} = h \,.\, t$$

eliminating t,

$$y \text{ or } \mathrm{Log}_N\, u = \frac{k}{h}\frac{u}{a}\,\mathrm{Log}_e \frac{a}{u} = -\frac{k}{h}\,\mathrm{Log}_e \frac{u}{a}$$

As the constants $\frac{k}{p}$ and a are entirely arbitrary, Lord Napier assigned to them the value

$$a = \frac{k}{h} = 10{,}000{,}000 = 10^7$$

and we accordingly have

$$\mathrm{Log}_N\, u = 10^7 \,.\, \mathrm{Log}_e \frac{10^7}{u}$$

$$= 161\ 180\ 956{\cdot}508\ 5832 - 10^7\ \mathrm{Log}_e\, u.$$

This is sufficient to show the difference between the two systems, the one of which increases with the numbers, while the other decreases: for example:

$\mathrm{Log}_N\ 1 = 161\ 180\ 956{\cdot}509\ 5832$	$\mathrm{Log}_e\ \ 1 = 0$
$\mathrm{Log}_N\ 2 = 154\ 249\ 484{\cdot}703\ 9837$	$\mathrm{Log}_e\ \ 2 = 0{\cdot}693\ 1472$
$\mathrm{Log}_N\ 10{,}000{,}000 = 0$	$\mathrm{Log}_e\ 10^7 = 16{\cdot}118\ 5957$

Errors of the Press in Wackerbarth's "Fem-ställiga Logarithm-tabelle."

Page 5, Log 2139, *for* 721 *read* 021.
28, Log 8827, *for* 681 *read* 581.
137, Cos 36° 54′, *for* 9·98, *read* 9·90.
223, Colog. Sun's Parallax, *for* 0·04, *read* 9·04.

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